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EXAMINER	
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ART UNIT	PAPER NUMBER
2611	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/583,593	LEE ET AL.	
	Examiner	Art Unit	
	LEON-VIET Q. NGUYEN	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 March 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,7 and 10-23* is/are rejected.

7)☒ Claim(s) *5,6,8 and 9* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 June 2006* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *8/25/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on 8/25/06 was filed after the mailing date of the 8/25/06. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Drawings

1. Figures 1-3 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-4, 7, 10-12, 14, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hadad (US20060076278) in view of Simmonds (US7418039).

Re claim 1, Hadad teaches a method for allocating pilots and data to an uplink channel in an OFDMA (orthogonal frequency division multiple access) system, comprising:

i) partitioning subcarrier groups and symbols from the uplink channels (¶0091), and allocating at least one subchannel based on the partitioned subcarrier groups and the symbols (¶0093);

ii) hopping the subcarrier groups according to a hopping pattern (¶0032), and allocating data, the subcarrier groups being caused by the subchannel to allocated in step i) (¶0090-¶0099); and

iii) differently allocating the subcarrier group based on the pattern from the data hopped in step ii) (fig. 5, ¶0109-¶0120) .

Hadad fails to teach partitioning subcarrier groups based on a basic pilot pattern generated by a specific reference. However Simmonds teaches partitioning subcarrier groups based on a basic pilot pattern generated by a specific reference (col. 4 lines 41-48 and lines 63-67, col. 5 lines 42-51). Furthermore it would be obvious to re-allocate the data in step iii), as taught by Hadad, according to the pilots taught by Simmonds.

Therefore taking the combined teachings of Hadad and Simmonds as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the step of Simmonds into the method of Hadad. The motivation to combine Simmonds and Hadad would be to improve throughput (col. 5 lines 13-17 of Simmonds).

Re claim 2, the modified invention of Hadad teaches a method wherein the subcarrier groups are partitioned by a prime number (¶0083-¶0084 of Hadad).

Re claim 3, the modified invention of Hadad teaches a method wherein the subchannel allocated in step i) is allocated by at least one subcarrier group on the frequency axis (¶0067 and fig. 2 of Hadad, the subcarriers are in the frequency domain before being transformed to the time domain), and by a unit of more than two symbols on the time axis (¶0068 and IFFT 214 in fig. 2 of Hadad, it would be obvious to have more than two symbols converted to the time domain).

Re claim 4, the modified invention of Hadad teaches a method wherein step ii) comprises using an RS code with the same length as that of the subchannel (¶0109-¶0110 of Hadad), and generating the hopping pattern (¶0032 of Hadad).

Re claim 7, the modified invention of Hadad teaches a method wherein step iii) comprises:

a) partitioning the bandwidth of the uplink channel into a plurality of subcarrier groups having a specific number of subcarriers (¶0063-¶0064 of Hadad, it would be obvious to partition a certain amount of bandwidth for each user); and

b) allocating a pilot to each subcarrier group (col. 5 lines 42-48 of Simmonds), wherein a basic pilot pattern with a different pilot position is generated to each subcarrier group (col. 5 lines 48-55 of Simmonds).

Re claim 10, all of the claim limitations have been analyzed and rejected with respect to claim 1. Furthermore Hadad teaches transmitting the allocated subcarrier groups (¶0065 and ¶0067 of Hadad).

Re claim 11, the modified invention of Hadad teaches a method wherein step a) comprises receiving a subcarrier group and a subchannel with more than two continuous symbols (¶0004 of Hadad, since symbols are transmitted in parallel, it is interpreted that there are at least two symbols. Furthermore it would be obvious to use more than two symbols).

Re claim 12, the modified invention of Hadad teaches a method wherein step b) comprises:

d) converting the data and the pilots into respective parallel signals according to the data to be transmitted and the number of pilot subcarriers (SPC 212 in fig. 2 of Hadad);

e) respectively modulating the parallel data and signals converted in step d) (SMU 213 in fig. 2 of Hadad); and

f) receiving the data and the pilot modulated in step e) (fig. 2 of Hadad), performing an IFFT as (inverse fast Fourier transform) on the pilot-inserted data based on the data and the pilots allocated in step a) (IFFT 214 in fig. 2 of Hadad), and converting them into time domain signals (this is a well known feature of IFFT's).

Re claim 14, all of the claim limitations have been analyzed and rejected with respect to claim 4.

Re claim 15, all of the claim limitations have been analyzed and rejected with respect to claim 1. It would be necessary to have a method in the receiver that performs the reverse operations of the transmitter to recover the transmitted signal. Furthermore, Hadad teaches converting the data transmitted by the transmitter into frequency domain signals (FFT 233 in fig. 2 of Hadad) and demodulating the data (SDU 234 in fig. 2 of Hadad).

3. Claims 13 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hadad (US20060076278) and Simmonds (US7418039) in view of Applicant's Admitted Prior Art (hereby referred to as AAPA).

Re claim 13, the modified invention of Hadad fails to teach a method wherein step c) comprises:

adding a cyclic prefix to the time domain signals converted in step f), and converting them into serial signals; and

converting the serial signals into analog signals, filtering the analog signals, and transmitting the filtered signals to the receiver.

However AAPA teaches adding a cyclic prefix (Add CP in fig. 1) to the time domain signals (the output of IFFT 6 in fig. 1), and converting them into serial signals (Parallel/Serial Converter 8 in fig. 1); and

converting the serial signals into analog signals (D/A converter 12 in fig. 1), filtering the analog signals (filer 12 in fig. 1), and transmitting the filtered signals to the receiver (the transmit antenna connected to transmitter 10 in fig. 1).

Therefore taking the modified teachings of Hadad and Simmonds with AAPA as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the step of AAPA into the method of Hadad and Simmonds. The motivation to combine AAPA, Simmonds, and Hadad would be to enable reliability of high speed and large capacity services (page 2 lines 2-6 of AAPA).

Re claim 16, the modified invention of Hadad fails to teach a method wherein step a) comprises:

d) filtering the data transmitted by the transmitter, and converting the filtered data into digital signals;

e) eliminating a cyclic prefix of the digital signal, and converting them into parallel signals; and

f) performing an FFT (fast Fourier transform) on the parallel signals and converting them into frequency domain signals.

However AAPA teaches the steps of:

d) filtering the data transmitted by the transmitter, and converting the filtered data into digital signals (A/D converter and filter 29 in fig. 1);

e) eliminating a cyclic prefix of the digital signal (Eliminate CP in fig. 1), and converting them into parallel signals (Serial/parallel converter 28 in fig. 1); and

f) performing an FFT (fast Fourier transform) on the parallel signals and converting them into frequency domain signals (FFT unit 26 in fig. 1).

Therefore taking the modified teachings of Hadad and Simmonds with AAPA as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the step of AAPA into the method of Hadad and Simmonds. The motivation to combine AAPA, Simmonds, and Hadad would be to enable reliability of high speed and large capacity services (page 2 lines 2-6 of AAPA).

4. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hadad (US20060076278) and Simmonds (US7418039) in view of Laroia et al (US7397838).

Re claim 17, the modified invention of Hadad fails to teach a method wherein step b) comprises:

g) detecting positions of the data and the pilots based on the information of the data and the pilots;

h) reversely hopping the detected data; and

i) separating the reversely hopped data and pilots based on the positions of the data and the pilots detected in step g).

However Laroia teaches the steps of:

g) detecting positions of the data and the pilots based on the information of the data and the pilots (col. 1 lines 61-66);

h) reversely hopping the detected data (it would be obvious to have a process opposite of the hopping process utilized in the transmitter as claimed in 1 to recover the data); and

i) separating the reversely hopped data and pilots based on the positions of the data and the pilots detected in step g) (col. 5 lines 20-44).

Therefore taking the modified teachings of Hadad and Simmonds with Laroia as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the step of Laroia into the method of Hadad and Simmonds. The motivation to combine Laroia, Simmonds, and Hadad would be to remove the presence of inherent latency resulting from using a sequence of training symbols (col. 2 lines 16-19 of Laroia).

5. Claims 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hadad (US20060076278), Simmonds (US7418039) and Laroia et al

(US7397838) in view of Applicant's Admitted Prior Art (hereby referred to as AAPA).

Re claim 18, the modified invention of Hadad fails to teach a method wherein step c) comprises:

j) estimating a channel on the frequency axis based on the position of the pilot; and

k) using the channel estimate in step j), and demodulating and receiving the data.

However AAPA teaches the steps of:

j) estimating a channel on the frequency axis based on the position of the pilot (channel estimator 23 in fig. 1); and

k) using the channel estimate in step j), and demodulating and receiving the data (demodulator 24 in fig. 1).

Therefore taking the modified teachings of Hadad, Laroia and Simmonds with AAPA as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the step of AAPA into the method of Hadad, Laroia and Simmonds. The motivation to combine AAPA, Laraoia, Simmonds, and Hadad would be to enable reliability of high speed and large capacity services (page 2 lines 2-6 of AAPA).

Re claim 19, the modified invention of Hadad teaches a method wherein step j) comprises:

performing channel estimation from a specific subcarrier based on the position of the pilot (col. 4 lines 6-14 of Laroia), and estimating the frequency axis channel by interpolation using the channel estimate (col. 7 lines 27-35 of Simmonds).

6. Claim 20 rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art (hereby referred to as AAPA) in view of Hadad (US20060076278).

Re claim 20, AAPA teaches a transmitter for transmitting pilot-inserted transmit data to a receiver through an uplink channel in an OFDMA (orthogonal frequency division multiple access) system, comprising:

a serial/parallel converter for converting data and pilots into parallel go signals according to number of pilots and data subcarriers (serial/parallel converter 2 in fig. 1);

a modulator for modulating the parallel data and pilots converted by the serial/parallel converter (modulator 4 in fig. 1);

a multiplexer for inserting pilots into the data based on the allocated data and the pilots, and multiplexing them (although not explicitly taught, multiplexing is a well known feature of OFDM communications. Furthermore, pilot and training sequences are known to be inserted into transmission signals for synchronization purposes);

an IFFT (inverse fast Fourier transform) unit for converting the multiplexed frequency domain signals into time domain signals, and outputting the same (IFFT unit 6 in fig. 1);

a parallel/serial converter for adding a cyclic prefix to the signals output to by the IFFT unit, and converting them into serial signals (parallel/serial converter 8 in fig. 1); and

a digital/analog converter and filter for converting the serial signals output by the parallel/serial converter into analog signals, filtering them (A/A converter and filter 12 in fig. 1), and transmitting the filtered signals to the receiver through an RF (radio frequency) terminal (transmit antenna connected to transmitter 10 in fig. 1).

AAPA fails to teach a hopping pattern controller for receiving a specific subcarrier group and a subchannel of a specific symbol unit by a specific reference, hopping the specific subcarrier group according to a specific hopping pattern to allocate data, allocating pilots based on a specific pilot pattern from the allocated data, and transmitting information caused by the allocated data and pilots to the receiver, wherein the hopping pattern is generated by using an RS code which corresponds to a length of the subchannel.

However Hadad teaches receiving a specific subcarrier group and a subchannel of a specific symbol unit by a specific reference (¶0091, ¶0093), hopping the specific subcarrier group (¶0032) according to a specific hopping pattern to allocate data (¶0090-¶0099), allocating pilots based on a specific pilot pattern from the allocated data

(¶0090-¶0099), and transmitting information caused by the allocated data and pilots to the receiver (¶0065 and ¶0067 of Hadad), wherein the hopping pattern is generated by using an RS code (¶0032) which corresponds to a length of the subchannel (¶0109-¶0110).

Therefore taking the combined teachings of AAPA and Hadad as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the feature of Hadad into the apparatus of AAPA. The motivation to combine Hadad and AAPA would be to improve the frequency reuse factor (¶0035 of Hadad).

7. Claims 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art (hereby referred to as AAPA) and Hadad (US20060076278) in view of Simmonds (US7418039).

Re claim 21, the modified invention of AAPA fails to teach a transmitter wherein the pilots are allocated to have different positions within the subcarrier group.

However Simmonds teaches transmitter wherein the pilots are allocated to have different positions within the subcarrier group (col. 5 lines 48-55 of Simmonds).

Therefore taking the modified teachings of AAPA and Hadad with Simmonds as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the feature of Simmonds into the apparatus of AAPA and Hadad. The motivation to combine AAPA, Simmonds and Hadad would be to improve throughput (col. 5 lines 13-17 of Simmonds).

Re claim 22, the modified invention of AAPA teaches a transmitter wherein the corresponding base station is distinguished based on the hopping pattern and the pilot pattern (fig. 5 of Hadad, ¶0105-¶0114 of Hadad).

8. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art (hereby referred to as AAPA) in view of Laroia et al (US7397838) and Hadad (US20060076278).

Re claim 23, AAPA teaches a receiver for receiving pilot-inserted transmit data from a transmitter through an uplink channel in an OFDMA (orthogonal frequency division multiple access) system, comprising:

an A/D (analog/digital) converter and filter for converting the data transmitted by the transmitter into digital signals (A/D converter and filter 29 in fig. 1);

a serial/parallel converter for eliminating a cyclic prefix from the digital signals, and converting them into parallel signals (serial/parallel converter 28 in fig. 1);

an FFT (fast Fourier transform) unit for performing an FFT on the parallel signals, and outputting frequency domain signals (FFT unit 26 in fig. 1);

a demultiplexer for separating the data and pilots based on the positions of the detected data and pilots (although not explicitly taught, multiplexing is a well known feature of OFDM communications. Furthermore, pilot and training sequences are known to be inserted into transmission signals for synchronization purposes);

a channel estimator for using the separated pilots and estimating a channel of the separated data (channel estimator 23 in fig. 1);

a demodulator for using the estimated channel estimate and demodulating the separated data (demodulator 24 in fig. 1); and

a parallel/serial converter for converting the demodulated parallel data into serial data (parallel/serial converter 22 in fig. 1).

AAPA fails to teach a hopping pattern controller for receiving information on the data and the pilots transmitted by the transmitter, detecting positions of the data and pilots from the frequency domain signals output through the FFT unit, and reversely hopping the data from the detected positions of the data, wherein the information follows the data allocated by hopping a specific subcarrier group from among the subcarrier groups partitioned based on a specific basic pilot pattern and follows the pilot allocated from the allocated data based on the specific pilot pattern;

However Laroia teaches receiving information on the data and the pilots transmitted by the transmitter, detecting positions of the data and pilots from the frequency domain signals output (col. 1 lines 61-66), and reversely hopping the data from the detected positions of the data it would be obvious to have a process opposite of the hopping process utilized in the transmitter as claimed in 20 to recover the data).

Therefore taking the combined teachings of AAPA with Laroia as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the feature of Laroia into the apparatus of AAPA. The motivation to

combine Laroia and AAPA would be remove to the presence of inherent latency resulting from using a sequence of training symbols (col. 2 lines 16-19 of Laroia).

Hadad teaches wherein the information follows the data allocated by hopping a specific subcarrier group from among the subcarrier groups partitioned based on a specific basic pilot pattern (¶0032) and follows the pilot allocated from the allocated data based on the specific pilot pattern (¶0090-¶0099).

Therefore taking the combined teachings of AAPA and Hadad as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the feature of Hadad into the apparatus of AAPA. The motivation to combine Hadad and AAPA would be to improve the frequency reuse factor (¶0035 of Hadad).

Allowable Subject Matter

9. Claims 5, 6, 8 and 9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LEON-VIET Q. NGUYEN whose telephone number is

(571)270-1185. The examiner can normally be reached on Monday-Friday, alternate Friday off, 7:30AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David C. Payne can be reached on 571-272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Leon-Viet Q Nguyen/
Examiner, Art Unit 2611

/David C. Payne/
Supervisory Patent Examiner, Art Unit 2611